IN THE CLAIMS:

Please cancel claims 1-4, 7, 15-16, 20-22, 26-27, 30, 35-37, and 40-65, and add new claims 66-119 as follows:

1-65. (Cancelled)

66. (New) A magnetoresistive device having a magnetic tunnel junction structure comprising:

a tunnel barrier layer;

a first ferromagnetic material layer of the BCC structure formed on a first side of said tunnel barrier layer; and

a second ferromagnetic material layer of the BCC structure formed on a second side of said tunnel barrier layer, wherein

said tunnel barrier layer is formed by a single-crystalline MgO_x (001) ($0 < x < 1$) or a poly-crystalline MgO_x ($0 < x < 1$) in which (001) crystal plane is preferentially oriented.

67. (New) The magnetoresistive device according to claim 66, wherein a discontinuous value (to be hereafter referred to as "the tunnel barrier height") between the bottom of the conduction band of said tunnel barrier layer and the Fermi energy of at least one of said first and said second ferromagnetic layers is in the range of 0.10 to 0.85 eV.

68. (New) The magnetoresistive device according to claim 67, wherein the tunnel barrier height is in the range of 0.2 to 0.5 eV.

69. (New) The magnetoresistive device according to claim 67, wherein said ferromagnetic material comprises a single-crystalline (001) of Fe or Fe-based alloy, or a poly-crystalline of Fe or Fe-based alloy in which (001) crystal plane is preferentially oriented.

70. (New) The magnetoresistive device according to claim 69, wherein the tunnel barrier height is in the range of 0.2 to 0.5 eV.

71. (New) A magnetoresistive device having a magnetic tunnel junction structure comprising:

a tunnel barrier layer;

a first ferromagnetic material layer of the BCC structure formed on a first side of said tunnel barrier layer; and

a second ferromagnetic material layer of the BCC structure formed on a second side of said tunnel barrier layer, wherein

said tunnel barrier layer comprises a single-crystalline MgO (001) or a poly-crystalline MgO in which (001) crystal plane is preferentially oriented, said MgO having oxygen vacancy defects and said tunnel barrier layer having the tunnel barrier height of 0.2 to 0.5 eV, and

an output voltage of said device is more than 200 mV at room temperature.

72. (New) A magnetoresistive device comprising:

a first ferromagnetic material layer of the BCC structure;

a second ferromagnetic material layer of the BCC structure; and

a magnesium oxide layer located between said first ferromagnetic material layer and said second ferromagnetic material layer, wherein

said magnesium oxide is a single-crystalline (001) or a poly-crystalline crystalline in which (001) crystal plane is preferentially oriented, and

said magnesium oxide has oxygen vacancy defects.

73. (New) A magnetoresistive device having a magnetic tunnel junction structure comprising:

a tunnel barrier layer;

a first ferromagnetic material layer formed on a first side of said tunnel barrier layer; and

a second ferromagnetic material layer formed on a second side of said tunnel barrier,

wherein

said tunnel barrier layer is formed by a poly-crystalline MgO_x ($0 < x < 1$) in which (001) crystal plane is preferentially oriented, and

the tunnel barrier height is in the range of 0.10 to 0.85 eV.

74. (New) The magnetoresistive device according to claim 73, wherein the tunnel barrier height is in the range of 0.2 to 0.5 eV.

75. (New) The magnetoresistive device according to claim 73, wherein a magnetoresistance ratio of said device is more than 70 %.

76. (New) The magnetoresistive device according to claim 73, wherein an output voltage of said device is more than 200 mV at room temperature.

77. (New) A magnetoresistive device having a magnetic tunnel junction structure comprising:

a tunnel barrier layer;

a first ferromagnetic material layer formed on a first side of said tunnel barrier layer; and

a second ferromagnetic material layer formed on a second side of said tunnel barrier layer, wherein

said tunnel barrier layer comprises a poly-crystalline MgO in which (001) crystal plane is preferentially oriented, said MgO having oxygen vacancy defects,

said tunnel barrier layer has the tunnel barrier height of 0.2 to 0.5 eV,

a magnetoresistance ratio of said device is more than 70 %, and

an output voltage of said device is more than 200 mV at room temperature.

78. (New) A magnetoresistive device having a magnetic tunnel junction structure comprising:

a tunnel barrier layer;

a first ferromagnetic material layer formed on a first side of said tunnel barrier layer; and

a second ferromagnetic material layer formed on a second side of said tunnel barrier layer, wherein

said tunnel barrier layer comprises a poly-crystalline magnesium oxide having oxygen vacancy defects in which (001) crystal plane is preferentially oriented,

said tunnel barrier layer has the tunnel barrier height of 0.2 to 0.5 eV,

a magnetoresistance ratio of said device is more than 70 %, and

an output voltage of said device is more than 200 mV at room temperature.

79. (New) A magnetoresistive device having a magnetic tunnel junction structure comprising:

a tunnel barrier layer;

a first ferromagnetic material layer formed on a first side of said tunnel barrier layer; and

a second ferromagnetic material layer formed on a second side of said tunnel barrier layer, wherein

said tunnel barrier layer comprises a poly-crystalline magnesium oxide in which (001) crystal plane is preferentially oriented,

said tunnel barrier layer has the tunnel barrier height of 0.2 to 0.5 eV,

a magnetoresistance ratio of said device is more than 70 %, and

an output voltage of said device is more than 200 mV at room temperature.

80. (New) A magnetoresistive device having a magnetic tunnel junction structure comprising:

a tunnel barrier layer;

a first amorphous ferromagnetic material layer formed on a first side of said tunnel barrier layer; and

a second amorphous ferromagnetic material layer formed on a second side of said tunnel barrier layer, wherein

said tunnel barrier layer comprises a poly-crystalline MgO_x ($0 < x < 1$) in which (001) crystal plane is preferentially oriented.

81. (New) The magnetoresistive device according to claim 80, wherein said first and second amorphous ferromagnetic material layers comprise CoFeB alloy.

82. (New) A magnetoresistive device having a magnetic tunnel junction structure comprising:

a tunnel barrier layer;

a first ferromagnetic material layer formed on a first side of said tunnel barrier layer; and

a second ferromagnetic material layer formed on a second side of said tunnel barrier layer, wherein

said first and second ferromagnetic material layer comprise an amorphous CoFeB alloy and

said tunnel barrier layer comprises a poly-crystalline magnesium oxide in which (001) crystal plane is preferentially oriented, said magnesium oxide having oxygen vacancy defects.

83. (New) A magnetoresistive device having a magnetic tunnel junction structure comprising:

a first ferromagnetic material layer;

a tunnel barrier layer deposited on the first ferromagnetic material layer; and

a second ferromagnetic material layer formed on said tunnel barrier layer, wherein

at least said first ferromagnetic material layer is amorphous and

said tunnel barrier layer comprises a poly-crystalline MgOx ($0 < x < 1$) in which (001) crystal plane is preferentially oriented.

84. (New) The magnetoresistive device according to claim 83, wherein said first ferromagnetic material layer comprises CoFeB alloy.

85. (New) The magnetoresistive device according to claim 83, wherein said tunnel barrier layer has the tunnel barrier height of 0.2 to 0.5 eV.

86. (New) The magnetoresistive device according to claim 85, wherein said first ferromagnetic material layer comprises CoFeB alloy.

87. (New) A magnetoresistive device having a magnetic tunnel junction structure comprising:

a first ferromagnetic material layer;

a tunnel barrier layer deposited on the first ferromagnetic material layer; and

a second ferromagnetic material layer formed on said tunnel barrier layer, wherein

at least said first ferromagnetic material layer is amorphous and

said tunnel barrier layer comprises a poly-crystalline magnesium oxide in which (001) crystal plane is preferentially oriented, said magnesium oxide having oxygen vacancy defects.

88. (New) A magnetoresistive device having a magnetic tunnel junction structure comprising:

a first ferromagnetic material layer;

a tunnel barrier layer deposited on the first ferromagnetic material layer; and

a second ferromagnetic material layer formed on said tunnel barrier layer, wherein

at least said first ferromagnetic material layer is amorphous and

said tunnel barrier layer comprises a poly-crystalline magnesium oxide in which (001) crystal plane is preferentially oriented.

89. (New) A memory device comprising:

a transistor; and

a magnetoresistive device comprising a tunnel barrier layer; a first ferromagnetic material layer formed on a first side of said tunnel barrier layer; and a second ferromagnetic material layer formed on a second side of said tunnel barrier layer, wherein

said tunnel barrier layer is formed by a single-crystalline [(001)] MgO_x (001) ($0 < x < 1$) or a poly-crystalline MgO_x ($0 < x < 1$) in which (001) crystal plane is preferentially oriented, wherein

the tunnel barrier height of said tunnel barrier layer is in the range of 0.2 to 0.5 eV and

said magnetoresistive device is used as a load for said transistor.

90. (New) A tunnel barrier layer comprising a poly-crystalline MgOx ($0 < x < 1$) in which (001) crystal plane is preferentially oriented and having the tunnel barrier height of 0.2 to 0.5 eV.

91. (New) A tunnel barrier layer used for a magnetoresistive device having an output voltage of more than 200 mV, wherein

said tunnel barrier layer is formed by a poly-crystalline MgO_x ($0 < x < 1$) in

which (001) crystal plane is preferentially oriented and

the tunnel barrier height of said tunnel barrier layer is in the range of 0.2 to 0.5 eV.

92. (New) A tunnel barrier layer used for a magnetoresistive device having an output voltage of more than 200 mV, wherein

said tunnel barrier layer is formed by a poly-crystalline MgO in which (001) crystal plane is preferentially oriented, said MgO having oxygen vacancy defects and

the tunnel barrier height of said tunnel barrier layer is in the range of 0.2 to 0.5 eV.

93. (New) A tunnel barrier layer deposited on a ferromagnetic material layer, wherein

said tunnel barrier layer is formed by a poly-crystalline MgO_x ($0 < x < 1$) in which (001) crystal plane is preferentially oriented and

the tunnel barrier height of said tunnel barrier layer is in the range of 0.2 to 0.5 eV.

94. (New) A tunnel barrier layer deposited on an amorphous ferromagnetic material layer, wherein

said tunnel barrier layer is formed by a poly-crystalline MgO_x ($0 < x < 1$) in which (001) crystal plane is preferentially oriented.

95. (New) The tunnel barrier layer according to claim 94, wherein said amorphous ferromagnetic material is CoFeB alloy.

96. (New) The tunnel barrier layer according to claim 94, wherein said tunnel barrier layer has the tunnel barrier height of 0.2 to 0.5 eV.

97. (New) The tunnel barrier layer according to claim 96, wherein said ferromagnetic material is CoFeB alloy.

98. (New) A tunnel barrier layer deposited on an amorphous ferromagnetic material layer, wherein

said tunnel barrier layer comprises a poly-crystalline magnesium oxide in which (001)

crystal plane is preferentially oriented, said magnesium oxide having oxygen vacancy defects.

99. (New) The tunnel barrier layer according to claim 98, wherein said ferromagnetic material comprises CoFeB alloy.

100. (New) A tunnel barrier layer deposited on an amorphous ferromagnetic material layer, wherein

said tunnel barrier layer comprises a poly-crystalline magnesium oxide in which (001) crystal plane is preferentially oriented.

101. (New) The tunnel barrier layer according to claim 100, wherein said ferromagnetic material comprises CoFeB alloy.

102. (New) A method of manufacturing a magnetoresistive device comprising:

preparing a substrate;

depositing a first amorphous ferromagnetic material layer on said substrate;

forming an amorphous MgO or MgO_x ($0 < x < 1$) layer on said first amorphous ferromagnetic material layer and then crystallizing said amorphous MgO or MgO_x ($0 < x < 1$) layer by annealing so as to form a tunnel barrier layer comprising a poly-crystalline MgO or MgO_x ($0 < x < 1$) in which (001) crystal plane is preferentially oriented; and

depositing a second amorphous ferromagnetic material layer on said tunnel barrier layer.

103. (New) The method of manufacturing a magnetoresistive device according to claim 102, wherein the method further comprises an annealing step as to partially or entirely crystallize said amorphous ferromagnetic material layer or layers.

104. (New) A method of manufacturing a magnetoresistive device comprising;

preparing a substrate;

depositing a first amorphous ferromagnetic material layer on said substrate;

forming an amorphous magnesium oxide layer on said first amorphous ferromagnetic material layer and then crystallizing said amorphous magnesium oxide

layer by annealing so as to form a tunnel barrier layer comprising a poly-crystalline magnesium oxide in which (001) crystal plane is preferentially oriented; and

depositing a second amorphous ferromagnetic material layer on said tunnel barrier layer.

105. (New) The method of manufacturing a magnetoresistive device according to claim 104, wherein the method further comprises an annealing step as to partially or entirely crystallize said amorphous ferromagnetic material layer or layers.

106. (New) A method of manufacturing a part of magnetoresistive device having a magnetic tunnel junction structure comprising:

preparing a substrate;

depositing a first amorphous ferromagnetic material layer on said substrate;

forming an amorphous magnesium oxide layer on said first amorphous ferromagnetic material layer and then crystallizing said amorphous magnesium oxide layer by annealing so as to form a tunnel barrier layer comprising a poly-crystalline magnesium oxide in which (001) crystal plane is preferentially oriented.

107. (New) The method of manufacturing a part of magnetoresistive device having a magnetic tunnel junction structure according to claim 106, wherein said poly-crystalline magnesium oxide has oxygen vacancy defects.

108. (New) The method of manufacturing a part of magnetoresistive device having a magnetic tunnel junction structure according to claim 106, wherein said ferromagnetic material is CoFeB alloy.

109. (New) The method of manufacturing a part of magnetoresistive device having a magnetic tunnel junction structure according to claim 108, wherein said poly-crystalline magnesium oxide has oxygen vacancy defects.

110. (New) A magnetic multilayer film comprising:

a first ferromagnetic material layer comprising an amorphous magnetic alloy;

a second ferromagnetic material layer comprising an amorphous magnetic alloy; and

a crystalline magnesium oxide layer located between said first ferromagnetic material layer and said second ferromagnetic material layer.

111. (New) The magnetic multilayer film according to claim 110, wherein

said crystalline magnesium oxide is a poly-crystalline magnesium oxide in which (001) crystal plane is preferentially oriented.

112. (New) The magnetic multilayer film according to claim 110, wherein each of said ferromagnetic materials comprises CoFeB alloy.

113. (New) The magnetic multilayer film according to claim 112, wherein said crystalline magnesium oxide is a poly-crystalline magnesium oxide in which (001) crystal plane is preferentially oriented.

114. (New) A magnetic multilayer film comprising:

a first ferromagnetic material layer;

a second ferromagnetic material layer; and

a crystalline magnesium oxide layer located between said first ferromagnetic material layer and said second ferromagnetic material layer, said magnesium oxide layer has oxygen vacancy defects.

115. (New) A multilayer structure comprising:

a first ferromagnetic material layer comprising an amorphous CoFeB alloy;

a crystalline magnesium oxide layer deposited on said first ferromagnetic layer; and

a second ferromagnetic material layer deposited on said crystalline magnesium oxide layer.

116. (New) The multilayer structure according to claim 115, wherein said crystalline magnesium oxide is poly-crystalline magnesium oxide.

117. (New) The multilayer structure according to claim 115, wherein said crystalline magnesium oxide is poly-crystalline magnesium oxide in which (001) crystal plane is preferentially oriented.

118. (New)The multilayer structure according to claim 115, wherein said amorphous magnetic material layer have been partially or entirely crystallized by post-annealing.

119. (New) The multilayer structure according to claim 117, wherein said amorphous magnetic material layer have been partially or entirely crystallized by post-annealing.